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ABSTRACT

To enhance spelling achievement, 17 learning disabled (LD) elementary school students were instructed for eight sessions over a period of 3 weeks with lessons that incorporated reduced unit size, distributed practice and review, and training for transfer. Each week of instruction included training on both irregular and regular spelling words. While the children could spell less than 10% of the words on the pretest, they were able to achieve on transfer words on a delayed posttest. Findings suggested that disabled children can improve their spelling skills if sound remedial principles are applied consistently. The instructional sequence described can serve both as an example of effective spelling instruction and as a diagnostic, trial remediation technique for a disabled population. Appended is a paper titled "A Small Scale Investigation of the Relative Effectiveness of "LD Efficient" Lessons in Spelling" by N. Bryant, et al. (Author/SB)

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DESIGNING SPELLING INSTRUCTION FOR LEARNING DISABLED YOUNGSTERS: AN EMPHASIS ON UNIT SIZE, DISTRIBUTED PRACTICE, AND TRAINING FOR TRANSFER

N. Dale Bryant, Harriet R. Fayne, and Maribeth Gettinger

Addendum:

A Small Scale Investigation of the Relative Effectiveness of "LD Efficient" Lessons in Spelling

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Abstract

A large number of learning disabled children demonstrate poor spelling skills. While spelling difficulties are a natural concomitant of reading disorders, it is unlikely that reading remediation alone will be sufficient to improve disabled children's ability to spell. This paper describes an intervention which has been designed specifically to enhance spelling achievement for learning disabled, elementary school youngsters. Seventeen LD children were instructed for eight sessions over a period of three weeks with lessons that incorporated reduced unit size, distributed practice and review, and training for transfer. While these children could spell less than 10% of the words on the pretest, they were able to achieve over 70% accuracy on spelling words taught and 67% accuracy on transfer words on a delayed posttest. Findings suggest that disabled children can improve their spelling skills if sound remedial principles are applied consistently. The instructional sequence described in this paper can serve both as an example of effective spelling instruction and as a diagnostic, trial-remediation technique for a disabled population.

Designing Spelling Instruction for Learning Disabled Youngsters: An Emphasis on Unit Size, Distributed Practice, and Training for Transfer

Poor spelling is not a problem limited to handicapped children (see Horn, 1969), but spelling difficulties are particularly pronounced in a learning disabled (LD) population. Kahn (1976) reviewed relevant literature and concluded that spelling problems were an inevitable concomitant of reading disabilities. Generally, spelling deficiencies are more severe (Critchley, 1970; Rabinovich, 1968) than reading difficulties. Many individuals, after remedial help, appear to compensate for their reading difficulties but typically spell poorly throughout their lives (Rabinovich, 1968).

Spelling may be a more difficult task than reading. While words can be recognized in reading on the basis of a relatively small set of critical features drawn from a fund of phonological, syntactic, and semantic knowledge (Gibson & Levin, 1975; Goodman, 1970; Smith, 1971), words must be remembered in a precise fashion in order to spell them accurately. In addition, stimulus properties for the two tasks may not be equally easy to manipulate (Cronnell, 1971). Whereas stimuli for reading are concrete and permanent, written symbols, stimuli for spelling are either actual or "inner" speech productions. Analyzing individual phoneme-grapheme associations in a spoken word is a difficult task for most young children (Calfee, Chapman, & Venezky, 1972) and, in particular, for underachieving children (Liberman, Shankweiler, Fischer, & Carter, 1972). The ability to segment words is one prerequisite skill for spelling.

In addition, spelling requires revisualization skills, or adequate visual memory (Smith, 1977). Venezky (1970), in his analysis of English orthography, revealed that, while there are only 26 letters to represent 40 phonemes, there are at least 58 spelling units to learn, if one counts letter combinations. For example, a youngster must learn at least three grapheme patterns which spell the phoneme /ee/. When choosing among various possible spellings, revisualization serves as a useful strategy.

Spelling instruction for disabled learners has received very little attention in the literature (Stanback, 1979). While there are few definitive conclusions that can be drawn from research findings, there are certain working hypotheses which can be formulated. It would appear that the number of words to be studied in an individual lesson may be a critical variable in the performance of poor spellers. Rieth, Axelrod, Anderson, Hathaway, Wood, and Fitzgerald (1974) found that poor spellers performed better on weekly posttests when given only a portion of the week's words each day, with daily testing. Bryant, Drabin, and Gettinger (1980) demonstrated that variability on posttests among disabled youngsters could be reduced if the number of phonemically irregular words introduced per day was limited to three, and practice on these words was provided. Horn (1969) argued that the number of words taught to retarded spellers should be reduced to a manageable load.

Disabled learners benefit from practice which is distributed across several days of instruction. Schoephoerster (1962) compared variations of a standard "pretest on Monday, posttest on Friday" spelling routine with three ability groupings. While above-average spellers did well regardless of condition, average spellers benefited from a mid-week test and low-ability spellers benefited from daily practice as well.

While limiting the number of words and giving daily practice should improve the performance of poor spellers, there are practical considerations which need to be taken into account when designing remedial instruction. If LD children can successfully place only a few words per day in their word store and require constant review of these words in order to retain them, how can LD youngsters hope to build up a spelling repertoire which is large enough to be useful? Helping these youngsters to "discover" phonic generalizations which can be applied to a large number of words might increase teaching efficiency. Even able youngsters seem to benefit from instruction which stresses generalization of rules, spelling patterns, or grapheme-phoneme regularities (Gates, 1935; Personké, 1967), but such direct teaching may have its maximum effects on less able youngsters (Pescosolido, undated). Brighter or more capable learners may be able to infer generalizations and transfer them to novel words without teacher assistance (Carroll, 1930). Generalization training for poor spellers needs to incorporate orthographic regularities in a focused and systematic fashion and create a structure for transfer of training to take place (Ellis, 1965).

The present study was designed to evaluate the effectiveness of an instructional sequence in spelling which included the teaching of phonemically regular and irregular words. The instruction included nine lessons taught to small groups over a period of three weeks. Lessons incorporated the principles of limiting unit size, providing distributed practice and review, and training for transfer. The authors sought to determine the extent to which LD children could learn and apply encoding skills when they were taught with lessons that incorporated these basic instructional principles.

Method

Subjects

Seventeen children (10 boys and 7 girls), enrolled in diagnostic-remedial classes in New York City public schools or in a remedial reading clinic in New York, participated in the experimental instruction. The children had a mean chronological age of 105 months (SD = 12; range = 86-122) and were drawn from populations that represented predominantly lower socio-economic levels and black or hispanic ethnic backgrounds. All children had been classified as learning disabled by school or clinic personnel. Standardized test information was obtained from current files in each setting. Nine children had an average WISC-R Full Scale IQ of 93 (SD = 8; range = 84-107) and eight had an average Slossen IQ of 106 (SD = 14; range = 90-127). Children had a mean grade equivalent of 2.3 (SD = 0.8; range = 1.2 to 3.5) on either the Peabody Individual Achievement Test--word recognition subtest or the Gates-McKillop Reading Diagnostic Test--untimed word recognition subtest. While no standardized spelling test scores were available, all children demonstrated less than 10% accuracy on a pretest of the spelling words to be taught.

Procedures

The instructional procedures used were designed with the intent of optimizing the learning of phonemically regular and irregular spelling words for the learning disabled sample. Lessons were constructed to provide all children with an opportunity to achieve mastery in the spelling of nine phonemically irregular words and eight phonemically regular words. In addition, application practice was provided to teach for transfer of specific orthographic patterns to novel words and transfer of learned words to sentence contexts.

Children received eight 30-minute periods of instruction. The children were taught in groups of two to five on three days each week for two consecutive weeks and on two days during the third week. The lessons were conducted by four experimental teachers who received training which included careful reading of lesson scripts, familiarization with teaching materials, and simulated activities for each part of the lessons. In addition, each teacher was observed during an instructional period to insure that procedures were carried out according to the prescribed scripts.

Teaching materials. Nine 5-letter irregular words were taught over three weeks. They were selected on the basis of their phonemic irregularity (spelling "demons" that are not spelled the way they sound) and level of difficulty (second through sixth grade) from the New Iowa Spelling Scale (Greene, 1954). The words were grouped into three units of three words each; one three-word unit was taught during the second lesson of each week.

Four spelling patterns (ea, ai, oa, ar) were taught in the context of eight regular words. Each regular word contained four letters--consonant, medial vowel combination or pattern, and final consonant. There were two training words for each of the four patterns taught. These words were grouped into two units of four (two training words for two patterns); one four-word unit was taught during the first lesson of weeks one and two. Week three was devoted to the integration and transfer of the four patterns. In addition, 24 regular words (six for each pattern) were used during the transfer training. These words contained the same medial combinations as the training words, but had different beginning and final consonants. The specific words taught during each week as well as examples of transfer words are shown in Table 1.

Table 1

Training Words and Examples of Transfer Words Used During Spelling Instruction

Weeks	Irregular Words	Regular Words	
	Training	Training	Transfer
Week One	watch	neat	lean
	ghost	beak	seam
	quart	laid	bait
		gain	maid
Week Two	chief	soak	toad
	aunts	loaf	coat
	thumb	farm	bark
		cart	darn
Week Three*	wrong		
	blind		
	glove		

*No regular words were introduced during Week Three. Instruction focused on application and transfer of the four patterns taught.

Summary of lesson format. Each week of instruction included training on both irregular and regular spelling words. For each week, the first lesson concentrated on regular words, the second lesson taught irregular words, and the third lesson included list practice and sentence practice for the week's combined regular and irregular words. See Table 2 for an outline of activities for week one.

Table 2

Outline of Week One Activities

Lesson 1: Introduce 4 regular words: neat, gain, beak, laid
Write individual words to criterion (with corrective feedback)
Write 4-word unit to criterion (with corrective feedback)
Transfer training for ea and ai patterns

Lesson 2: Test on Lesson 1 regular words (with corrective feedback)
Introduce 3 irregular words: watch, ghost, quart
Letter fill-in practice on individual words
Write individual words to criterion (with corrective feedback)
Write 3-word unit to criterion (with corrective feedback)

Lesson 3: Test on Lesson 2 irregular words (with corrective feedback)
Sentence fill-in practice for 7 Week One training words
Sentence writing practice with 7 training words
Week One posttest

The following activities were included in the teaching of both irregular and regular words: (1) oral spelling; (2) presentation and practice of words one at a time (rather than as an entire unit of three or four words); (3) teaching in small instructional units of only three or four words each day; (4) mastery practice in which individual words were written to a criterion level of three consecutive correct trials and three- or four-word daily units were written correctly on two consecutive trials; (5) immediate and corrective feedback after each dictation; (6) selective focus on difficult or misspelled parts of words; (7) distributed and cumulative practice, whereby three- or four-word units were learned, reviewed, and integrated across the three weeks of instruction; and (8) sentence writing practice that began with sentence fill-ins (children filled in each training word on a worksheet as sentences were dictated), followed by sentence dictation and sentence generation (children wrote their own sentences containing training words).

Although irregular and regular words were taught using essentially the same instructional components described above, certain aspects of the training were specific to the regular or irregular words. Instruction for phonemically regular words focused on the specific pattern in each word through visual cues (i.e., color) as well as instructional cues that emphasized the symbol-sound associations. In addition, it provided directed training in transferring the spelling patterns taught to other non-training words containing those patterns.

Transfer training consisted of three activities. First, the teacher demonstrated how to analyze or break up a word into initial consonant-spelling pattern-final consonant elements. Two examples were provided, and children participated in the analysis of the words through directed questioning on the part of the teacher. The second activity involved an exercise in which children spelled new words containing learned patterns on a worksheet which was divided into columns according to specific patterns. Children were asked to write the words under the column headed by the appropriate pattern. As children wrote the words, the teacher monitored performance and gave corrective feedback. Finally, these words were dictated in a list format in order to give practice without the visual cues provided by the worksheet.

Instruction for irregular words did not draw attention to phoneme-grapheme relationships. In order to insure that children developed an exact representation of the irregular words, worksheets were designed to focus on each individual letter in a word with letter fill-in practice that required the children to supply first one, then two, and gradually all the missing letters in a word. This method is similar to one suggested in Johnson and Myklebust (1967).

Measurement. The pretest, administered by the experimental teachers one day prior to instruction, and the posttest, administered on the last day of instruction, were identical. The test was group-administered and consisted of the nine irregular training words, eight regular training words, and twelve regular transfer words (three for each training pattern) dictated in list presentation, as

well as seven dictated sentences containing all nine irregular and six regular words. Criterion-referenced tests were administered after each instructional unit (i.e., groupings of three irregular or four regular words) as well as retention measures for words from previous lessons. These tests served two functions: (1) they gave immediate information about students who needed individualized practice on particular words; and, (2) they served as a potential source of data on children's learning and retention of the material learned.

Results

Means, standard deviations, and obtained t values for pretest and posttest performance on spelling words in lists and in sentences are presented in Table 3. By the end of the three-week instructional program, children were able to encode an average of 71% of the phonemically irregular words and 81% of the phonemically regular words which had been covered in the lessons. Performance on words which contained training patterns, but which were not included in the training, indicated that the children were able to apply these vowel combinations to new words and to spell 67% of the transfer items correctly. In addition, children, on the average, were able to produce the irregular words in the context of sentences with 62% accuracy and regular words with 79% accuracy. Differences between pretest and posttest measures on all training and transfer items were significant beyond the .001 level.

Table 3

Means, Standard Deviations, and Obtained t Values for Pretest and Posttest Performance on Spelling Words in List Format and in the Context of Sentences

Measure	Possible Range	Pretest	Posttest	t Value
Irregular Words in Lists	0-9	0.47 (0.79)	6.35 (3.10)	7.97*
Regular Training Words in Lists	0-8	0.65 (0.99)	6.47 (2.40)	10.48*
Regular Transfer Words	0-12	0.88 (1.45)	8.06 (4.42)	6.41*
Irregular Words in Sentences	0-9	0.35 (0.70)	5.50 (3.34)	5.76*
Regular Words in Sentences	0-6	0.41 (0.61)	4.76 (2.01)	9.44*

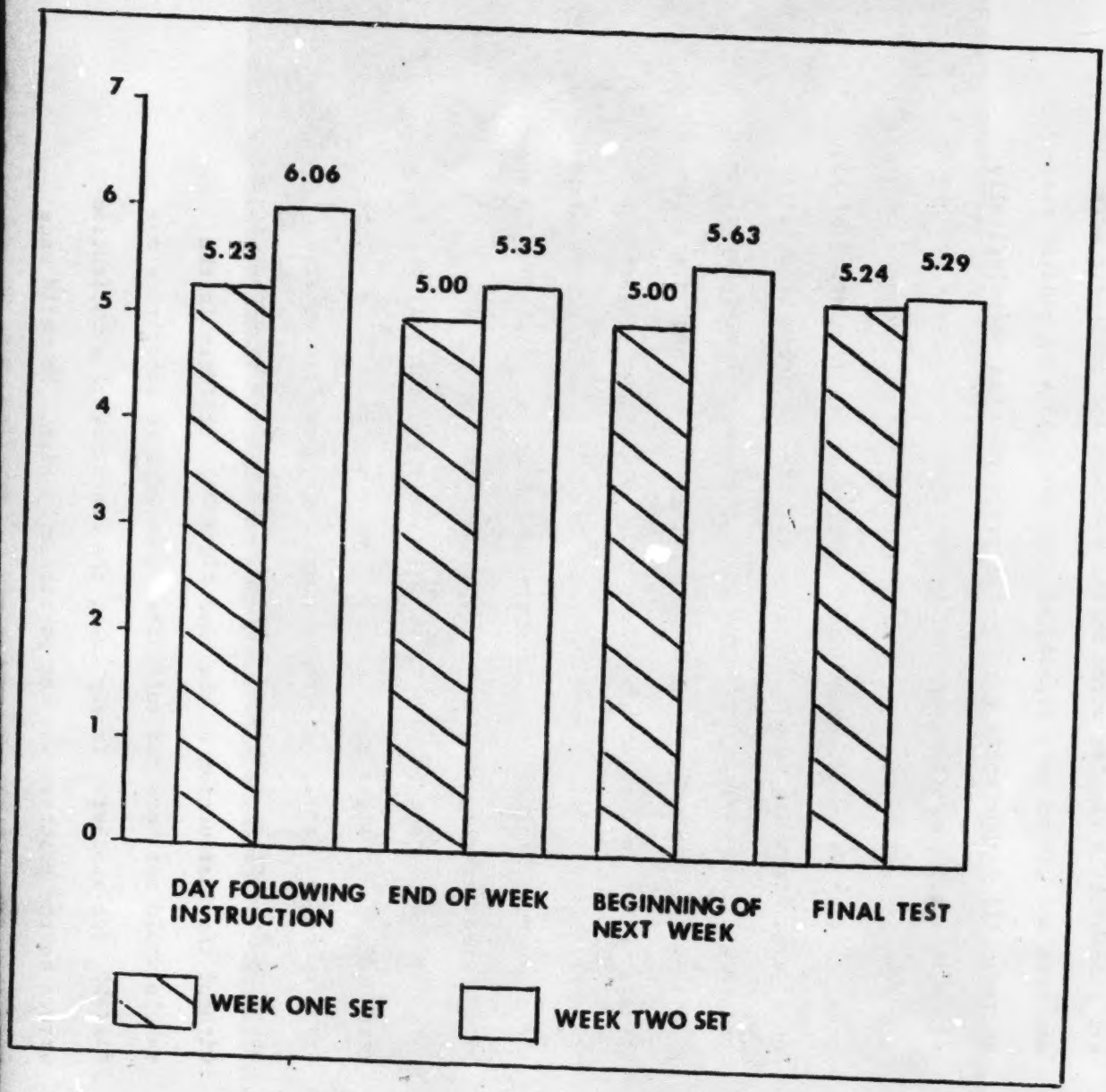
Note: N = 17

*$p < .001$

An examination of performance on the training words at various retention intervals revealed that the systematic testing and review incorporated in the lessons allowed children to maintain accuracy on the words that they learned. (See Figure 1.) On the average, children were able to spell approximately five of the seven words taught during week one and six of the seven words taught during week two, one day after initial instruction. By the end of the week's unit, there was evidence of only a slight decrement in performance, since the mean accuracy on the two sets fell between five and five and a half words. At the beginning of the following week and at the end of the entire program, children were still able to encode at least five words from each set.

Figure Caption

Figure 1. Average number correct on two sets of seven spelling words at four retention intervals.


7
6
5
4
3
2
1
0
6.06
5.23
5.35
5.00
5.63
5.00
5.24
5.29
DAY FOLLOWING INSTRUCTION
END OF WEEK
BEGINNING OF NEXT WEEK
FINAL TEST
WEEK ONE SET
WEEK TWO SET

In order to gain a further understanding of the spelling performance of disabled youngsters before and after the intervention, all phonemically regular words on the pretests and posttests were analyzed and errors were classified into the following general categories: (1) orthographic errors--the production was phonologically acceptable but was orthographically inaccurate (e.g., beke for beak); (2) phonological errors--the production included one grapheme or grapheme cluster which distorted the phonological representation of the word (e.g., form for iarm); (3) gross errors--the production did not resemble either correct orthographic or phonological representation of the word (e.g., stlk for gain or g for gain); (4) sequence errors--the production included an incorrect order of the two graphemes in a training digraph (e.g., saok for soak); and, (5) substitution errors--the production included a replacement of the correct digraph with one of the other training digraphs (e.g., larf for loaf).

Table 4 gives total errors on the twenty phonemically regular items before and after the three-week intervention. While orthographic, phonological, and gross errors decreased dramatically, substitution errors increased. This increase would be expected since, without the instruction on the four digraphs, children in the sample would not have had sufficient knowledge to substitute one digraph for another. In any case, the frequency of substitution errors on the posttest was not particularly high. No child made more than five substitution errors on the twenty words.

Discussion

Results of the present investigation document the effectiveness of spelling instruction which operationalizes the principles of reduced unit size, distributed practice, and specific transfer training. The 17 children taught with carefully designed procedures were able to learn an average of over 70% of the spelling words taught, to retain these words over time, and to write them correctly in the context of sentences. As a result of directed training in applying spelling patterns to a variety of words, these children were also able to spell 67% of the transfer words (containing the four training patterns) which had not been taught in the lessons.

Approximately half of the children were able to demonstrate at least 90% accuracy on the posttest measures and another two children had better than 80% accuracy. If mastery is defined as 80% accuracy or better, then about 60% of the sample was able to achieve a mastery level on both regular and irregular training and transfer words.

An example of posttest protocols of those children with less than 80% accuracy revealed three patterns of performance. The first pattern was characterized by inadequate retention of irregular words and criterion-level performance on regular words. Children who exhibited a second performance pattern were able to spell irregular but not regular words. A third group were able to encode less than 50% of both types of words. It is interesting to note that all children in this third group made gross errors on almost all of the 29 words on the pretest. These children were able to spell only one or two of the words covered in a day's lesson at the end of each

instructional period. In addition, these youngsters formed letters poorly and had inadequate or overadequate spaces between letters in a word. Despite incomplete initial learning and specific graphomotor difficulties, these children were able to spell two to seven of the 29 words on the posttest.

In summary, the lessons described in this paper serve not only as a model of systematic and effective instruction but also as trial remediation techniques. For youngsters who do not reach an 80% criterion level, it would be possible to make adaptations within the instructional framework and to evaluate the effectiveness of these modifications. Some possible changes include: recycling missed items, reducing the number of words covered in a lesson to one or two, utilizing simpler words, and minimizing the amount of writing required.

Results of this investigation suggest that a large number of LD children can improve their spelling skills if instruction incorporates classic principles of learning and remedial teaching. Future research which delineates the diagnostic profiles of children who do not attain high accuracy levels as a result of systematic teaching would be a worthwhile line of inquiry.

Table 4

A Comparison of Pretest and Posttest Errors on Twenty Phonemically Regular Words

Error Types	Pretest	Posttest
Gross Errors	131	31
Orthographic Errors	93	16
Phonological Errors	78	17
Sequence Errors[1]	11	8
Substitution Errors[2]	0	20

Note: The chart reflects the total number of errors, classified by type, which were made by the 17 subjects.

[1]A sequence error was defined as incorrect order of the two graphemes in a training digraph.

[2]A substitution error was defined as a replacement of the correct digraph included in the training.

References

Bryant, N. D., Drabin, I. R., & Gettinger, M. The effects of varying unit size on spelling achievement in learning disabled children. Manuscript submitted for publication, 1980.

Calfee, R., Chapman, R. S., & Venezky, R. L. How a child needs to think to learn to read. In L. W. Gregg (Ed.). Cognition in learning and memory. New York: John Wiley, 1972.

Carroll, H. A. Generalization of bright and dull children, a comparative study with special reference to spelling. Journal of Educational Psychology, 1930, 21, 489-499.

Critchley, M. The dyslexic child. London: William Heinemann Medical Books Ltd., 1970.

Ellis, H. C. Transfer of learning. New York: Macmillan Co., 1965.

Gates, A. I. Generalization and transfer in spelling. New York: Bureau of Publications, Teachers College, Columbia University, 1935.

Gibson, E. J. & Levin, H. The psychology of reading. Cambridge, Mass.: MIT Press, 1975.

Goodman, K. S. Behind the eye: What happens in reading. In K. S. Goodman & O. S. Niles (Eds.). Reading process and program. Urbana, Ill.: National Council of Teachers of English, 1970.

Greene, H. A. The new Iowa spelling scale. Iowa City, Iowa: Bureau of Educational Research and Service, State University of Iowa, 1954.

Horn, T. Spelling. In R. L. Ebel (Ed.). Encyclopedia of educational research (4th ed.). New York: Macmillan, 1969.

Johnson, D. J. & Myklebust, H. R. Learning disabilities: Educational principles and practices. New York: Grune & Stratton, 1967.

Kahn, G. A model for spelling instruction. Unpublished manuscript, 1976.

Liberman, I. Y., Shankweiler, D., Fischer, F. W., & Carter, B. Explicit syllable and phoneme segmentation in the young child. Journal of Experimental Child Psychology, 1974, 18, 201-212.

Personke, C. Effects of systematic instruction on ability to generalize in spelling. Elementary School Journal, 1967, 68, 71.

Pescosolido, J. R. A comparative study between a structured and thematic approach in spelling, the Stanley-Vance spelling experiment (Report No. LA-SI). New Britain, Conn.: Central Connecticut State College, undated.

Rabinovitch, R. D. Reading problems in children: Definitions and classification. In H. Keeny & V. T. Keeny (Eds.). Dyslexia: Diagnosis and treatment of reading disorders. St. Louis: Mosby, 1968.

Rieth, H., Axelrod, S., Anderson, R., Hathaway, F., Wood, K., & Fitzgerald, C. Influence of distributed practice and daily testing on weekly spelling tests. Journal of Educational Research, 1974, 68, 73-77.

Schoephoerster, H. Research into variations of the test-study plan of teaching spelling. Elementary English, 1962, 39, 460-462.

Smith, F. Understanding reading. New York: Holt, Rinehart & Winston, 1971.

Smith, H. Intelligence and spelling ability. Unpublished doctoral dissertation, Columbia University, 1977.

Stanback, M. Spelling (Research Review Series No. 3). New York: Teachers College, Columbia University, Institute for the Study of Learning Disabilities, 1979.

Venezky, R. L. Linguistics and spelling. In A. H. Marckwardt. Linguistics in school programs: The sixty-ninth yearbook of the national society for the study of education, 1970.

A Small Scale Investigation of the Relative Effectiveness of "LD Efficient" Lessons in Spelling

N. Dale Bryant, Harriet R. Fayne, and Maribeth Gettinger

A Small Scale Investigation of the Relative Effectiveness of "LD Efficient" Lessons in Spelling

In order to evaluate the relative efficacy of the three-week unit in spelling, the Basic Reading and Spelling Task Force carried out a field-based research project involving four LD Resource Rooms in the New York City public schools. A detailed rationale and description of the spelling packet, in addition to data collected by Institute staff members, is included in the manuscript entitled "Designing Spelling Instruction For Learning Disabled Youngsters: An Emphasis on Unit Size, Distributed Practice, and Training for Transfer." The actual curriculum has been submitted to the ERIC system (number not yet assigned).

Subjects. Twenty LD children, ranging in age from 8-10 years, were selected by their teachers because of a demonstrated inability to spell single syllable words. Only children with IQ scores within the average range were included in the sample. At the end of the three weeks of instruction, seven children (four female, three male) had completed the "LD Efficient" spelling lessons, and nine children (one female, eight male) had received teacher-constructed lessons for an equivalent instructional time period. Children were dropped from the study solely on the basis of absenteeism. All children in the experimental group (i.e., the group which received "LD Efficient" instruction) came from Black or Hispanic backgrounds. The control group was approximately 50% Caucasian and 50% Black or Hispanic. Teachers characterized their communities as lower or lower middle class.

Procedure. Two Resource Room teachers who participated in a training workshop sponsored by the Institute served as the experimental instructors. Two Resource Room teachers who were unable to attend the workshop because of scheduling difficulties served as controls. All four were asked to select from their rosters a group of five children who could benefit from remedial spelling instruction. The two experimental teachers were given an introduction to "LD Efficient" principles as well as a teaching script, student practice materials, and test protocols (materials submitted to ERIC, number not yet assigned). The control teachers were given the identical list of practice items, pre- and posttest forms, general instructions about a time framework, and a questionnaire designed to tap teaching strategies.

Measurement. A thirty-word, group-administered spelling test was used as a pre- and posttest. Nine words were phonemically irregular words which were included in the training. Eight words were phonemically regular and had also been introduced during the three weeks of instruction. The remaining 13 items were transfer words. While these words contained the four vowel combinations which had been included in the instruction (i.e., ai, ea, oa, ar), the actual words had not been exposed or practiced in the lessons.

Results. Table 1 gives pre- and posttest means, standard deviations, and gains for the two groups on irregular and regular training words as well as on transfer items. Both groups made gains as a result of three

weeks of instruction. However, whereas the group exposed to the "LD Efficient" packet demonstrated greater than 90% accuracy on transfer items, controls, on the average, were able to spell only 58% of the irregular training words, 72% of the regular training words and 63% of the transfer items.

A comparison of gains made by the two groups indicated that there were significant differences on irregular training words ($t(14\ df) = 2.91$, $p < .02$), and transfer words ($t(14df) = 5.12$, $p < .001$). The group who had been taught with "LD Efficient" procedures consistently demonstrated greater gains than did the controls instructed with teacher-designed lessons.

The questionnaires of the two control teachers indicated that their teaching styles were quite dissimiliar. While one teacher introduced only three words in an average lesson, the other introduced an average of ten words. While one reported that four vowel combinations were taught separately, the second contrasted three patterns (ea, ai, and oa) with ar as they were introduced. One teacher gave review on words learned in earlier lessons, and the other did not. It would appear that neither teacher incorporated all four of the "LD Efficient" principles (i.e., limited unit size, distributed practice, transfer training, and review) on a consistent basis.

Discussion. The results of this small-scale study appear to confirm the effectiveness of the "LD Efficient" spelling lessons. Children taught with these lessons were able to learn over 90% of the training items

and to transfer learned elements to over 85% of the novel words presented. In contrast, a comparable group of LD youngsters, taught with teacher-made lessons on the same items within an identical time framework demonstrated an average of only 60% accuracy on training and transfer items. While each of the control teachers reported that they incorporated one or two of the instructional principles that have been designated as "LD Efficient," neither seemed to operationalize all of the principles which had been carefully programmed into the Institute lesson packet.

This study gives additional evidence regarding the general usefulness of the spelling packet. More importantly, the comparison between the experimental and control groups indicate that remedial teachers may not always apply important instructional principles to their teaching. Further investigations with larger sample sizes and a greater number of participating teachers would prove useful to confirm these findings.

Table 1

Pretest and Posttest Means, Standard Deviations, and Average Gains for the Experimental and Control Groups

Variable	Experimental (N=7)			Controls (N=9)		
	Pretest	Posttest	Gains	Pretest	Posttest	Gains
Irregular Training Words (Range: 0-9)	1.14 (2.27)	8.71 (.76)	7.57	1.67 (1.50)	5.22 (2.91)	3.55
Regular Training Words (Range: 0-8)	2.28 (1.60)	7.43 (.79)	5.15	2.56 (1.88)	5.78 (1.64)	3.22
Transfer Words (Range: 0-13)	2.71 (3.04)	11.29 (1.38)	8.58	3.33 (2.87)	8.22 (1.92)	4.89

Note: Numbers in parentheses are standard deviations.